ADEYINKA SHERIFF GBOLAHAN

CIVIL ENGINEERING

16/ENG03/004

Adeyinka Sheriff Gbolahan
Civil Engineering
16/ENG03/004
ENG 281

Assignment

$x = \cos t + t\sin t$

$y = \sin t - t\cos t$

$\frac{dx}{dt} = -\sin t + \sin t + t\cos t$

$\frac{dx}{dt} = t\cos t \qquad \frac{dt}{dx} = \frac{1}{t\cos t}$

$\frac{dy}{dt} = \cos t - \cos t + t\sin t$

$\frac{dy}{dt} = t\sin t$

$\frac{dy}{dx} = \frac{dy}{dt} \times \frac{dt}{dx}$

$\frac{dy}{dx} = t\sin t \times \frac{1}{t\cos t}$

$\frac{dy}{dx} = \frac{t\sin t}{t\cos t}$

$\frac{dy}{dx} = \tan t$

$\frac{d^2y}{dx^2} = \sec^2 t \times \frac{dt}{dx}$

$\frac{d^2y}{dx^2} = \sec^2 t \times \frac{1}{t\cos t} = \frac{\sec^2 t}{t\cos t}$

Radius of curvature $= \frac{\left(1 + \left(\frac{dy}{dx}\right)^2\right)^{3/2}}{\frac{d^2y}{dx^2}}$

$R = \frac{(1 + \tan^2 t)^{3/2}}{\frac{\sec^2 t}{t\cos t}}$

$R = \frac{(\sec^2 t)^{3/2}}{\frac{\sec^2 t}{t\cos t}}$

Algebraic Sheriff Abdullahi
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$R = \frac{\sec^3 t}{\sec^2 t} \div \frac{\sec^2 t}{t \cos t}$

$R = \frac{\sec^3 t \times t \cos t}{\sec^2 t}$

$R = \sec t \times t \cos t$

Recall that $\sec t = \frac{1}{\cos t}$

$R = \frac{1}{\cos t} \times t \cos t$

$R = t$

$h = x_1 - R \sin t$

$k = y_1 + R \cos t$

$h = \cos t + t \sin t - t \sin t$

$h = \cos t$

$k = \sin t - t \cos t + t \cos t$

$= \sin t$

coordinate $(\cos t, \sin t)$

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